

1 We claim:

1. A method for inducing a host immune response against a multi-epitopic *in vivo* antigen that does not elicit an effective host immune response, the method comprising contacting the antigen with a composition comprising a binding agent that specifically binds to a first epitope on the antigen, the binding agent present in
5 the composition being non-radiolabeled; and allowing the binding agent to form a binding agent/antigen pair, whereby a host immune response is elicited against a second epitope on the antigen.

9 2. The method of claim 1, wherein the antigen is a soluble antigen.

3. The method of claim 2, wherein the soluble antigen is a tumor-associated antigen.

4. The method of claim 1, wherein the binding agent is selected from the group consisting of one member of an immunologic pair; an antibody or fragment thereof; a murine antibody or fragment thereof; a chimeric antibody or fragment thereof; a humanized antibody or fragment thereof; a bispecific antibody; a peptide; a fusion protein; and a protein.

21 5. The method of claim 4, wherein the binding agent comprises a native antibody.

6. The method of claim 4, wherein the antibody comprises an IgG1 antibody.

- 1 7. The method of claim 4, wherein the binding agent is a murine monoclonal antibody.
- 5 8. The method of claim 7, wherein the binding agent does not induce isotypic HAMA-induced toxicity in the host.
- 9 9. The method of claim 1, wherein the binding agent comprises B43.13.
10. The method of claim 1, wherein the binding agent has been activated.
11. The method of claim 10, wherein the binding agent has been exposed to radiation.
12. The method of claim 11, wherein the radiation is ultraviolet radiation.
13. The method of claim 10, wherein the binding agent that has been photoactivated.
14. The method of claim 1, wherein the antigen is an antigen selected from the group consisting of CA 125, CA 15.3, CA 19.9, PSA, an ovarian tumor antigen, and a gastrointestinal cancer antigen.
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1 15. The method of claim 1, wherein the binding agent is present in an amount of from about 0.1 μ g to about 2 mg per kg of body weight of the host.

16. The method of claim 15, wherein the amount of binding agent comprises
5 between about 0.1 μ g and about 200 μ g per kg of body weight of the host.

17. The method of claim 1, wherein the binding agent is present in an amount comprising a total dose of up to about 2 mg.

9 18. A method for altering a host immune response against an antigen comprising administering to the host a composition comprising a binding agent that specifically binds to the antigen and alters the immune response against the antigen, the binding agent present in the composition being non-radiolabeled, and being present in an amount of from about 0.1 μ g to about 2 mg per kg of body weight of the host.

19. The method of claim 18, wherein the antigen is an *in vivo* antigen that does not elicit an effective host immune response.

20. The method of claim 19, wherein the antigen is a soluble antigen and wherein a host immune response is induced against the antigen.

21 21. The method of claim 20, wherein the antigen is a multi-epitopic tumor-associated antigen.

1 22. The method of claim 18, wherein the antigen is CA 125.

23. A method for inducing a host immune response against a multi-epitopic *in vivo* antigen, the method comprising contacting the multi-epitopic antigen with a
5 composition comprising a binding agent exclusive of B43.13 that specifically binds to a first epitope on the antigen, and allowing the binding agent to form a binding agent/antigen pair, whereby a host immune response is elicited against a second epitope on the antigen.

9 24. The method of claim 23, wherein the antigen is a soluble, tumor-associated antigen.

25. The method of claim 23, wherein the antigen does not elicit an effective host immune response.

26. The method of claim 24, wherein the binding agent that has been activated.

27. The method of claim 26, wherein the binding agent has been exposed to ultraviolet irradiation.

21 28. A method for altering the host immune response against an antigen comprising administering to the host a composition comprising a binding agent exclusive of B43.13 that specifically binds to the antigen and alters the immune response against the antigen, the binding agent being present in an amount of from
25 about 0.1 μ g to about 2 mg per kg of body weight of the host.

1 29. The method of claim 28, wherein the antigen is an *in vivo* antigen that does not elicit an effective host immune response.

5 30. The method of claim 29, wherein the antigen is a soluble antigen and wherein a host immune response is induced against said antigen.

31. The method of claim 30, wherein the antigen is a multi-epitopic tumor-associated antigen.

9 32. The method of claim 1, 18, 23, or 28, wherein the antigen is associated with a human disease or pathological condition.

13 33. The method of claim 32, wherein the antigen is an antigen selected from the group consisting of CA 125, CA 15.3, CA 19.9, PSA, an ovarian tumor antigen, and a gastrointestinal cancer antigen.

17 34. The method of claim 32, wherein the human disease or condition is selected from the group consisting of cancer; tumor; drugs of abuse; multiple sclerosis; allergy; human immunodeficiency virus; bacterial infection; autoimmune diseases; human viruses; and asthma.

21 35. The method of claim 1, 18, 23, or 28, wherein the induced or altered immune response comprises a beneficial immune response.

1 36. The method of claim 35, wherein the beneficial immune response comprises an effective host immune response.

5 37. The method of claim 35, wherein the beneficial immune response includes at least one of the following: reduction in tumor size; reduction in tumor burden; stabilization of disease; production of antibodies against the binding agent/antigen complex; induction of the immune system; induction of one or more components of the immune system; cellular immunity and the molecules involved in its production; 9 humoral immunity and the molecules involved in its production; ADCC immunity and the molecules involved in its production; CDC immunity and the molecules involved in its production; natural killer cells; cytokines and chemokines and the molecules and cells involved in their production; antibody-dependent cytotoxicity; complement-dependent cytotoxicity; natural killer cell activity; and antigen-enhanced cytotoxicity.

13 38. The method of claim 1, 20, 23, or 30, wherein the host immune response comprises a cellular and a humoral immune response.

17 39. The method of claim 38, wherein the humoral response comprises anti-idiotypic antibodies.

21 40. The method of claim 1, 20, 23, or 30, wherein the host immune response comprises a cellular immune response.

25 41. The method of claim 1, 20, 23, or 30, wherein the host immune response

1 comprises a humoral immune response.

42. The method of claim 41, wherein the humoral response comprises anti-idiotypic antibodies

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43. A method for inducing a host immune response against a pre-determined multi-epitopic antigen present in a host's serum, which antigen does not elicit an effective host immune response, the method comprising contacting the antigen with a
9 composition comprising a binding agent that specifically binds to the antigen and allowing the binding agent to form a binding agent/antigen pair wherein a beneficial host immune response is elicited against the antigen.

44. The method of claim 43, wherein the multi-epitopic antigen is a soluble, tumor-associated antigen.

45. The method of claim 44, wherein the binding agent specifically binds to a first epitope on the antigen and wherein a host immune response is elicited against a second epitope on the antigen.

46. The method of claims 1, 18, 23, or 28, further comprising determining the
21 amount of antigen present in the host prior to contacting the antigen with the composition.

47. The method of claim 46, wherein the determination of the amount of

1 antigen present in the host further establishes that the antigen is present
in an amount greater than an amount indicative of a disease condition.

5 48. The method of claim 47, wherein the determination of the amount of antigen
present in the host further establishes that the antigen is present in an amount greater
than about three times the amount indicative of a disease condition.

9 49. The method of claims 1, 18, 23, or 28, wherein contacting comprises
administering the composition by any immunologically suitable route.

50. The method of claim 49, wherein the administering comprises intravenous or
subcutaneous administration.

51. The method of claims 1, 18, 23, or 28, wherein the composition further
comprises one or more adjuvants, one or more carriers, one or more excipients, one
or more imaging reagents, one or more pharmaceutically acceptable carriers, and/or
physiologically acceptable saline.

21 52. The method of claims 1, 18, 23, or 28, wherein the binding agent is
administered at a dosage that is the maximum amount of binding agent that does not
produce ADCC.

53. The method of claims 1, 18, 23, or 28, wherein the binding agent is coupled to
a photodynamic agent.

1 54. The method of claim 53, wherein the photodynamic agent includes hypocrellin and hypocrellin derivatives.

5 55. The method of claim 53, further comprising irradiating the host with a visible light source.

9 56. The method of claims 18, 23, and 28, wherein the binding agent is selected from the group consisting of one member of an immunologic pair; an antibody or fragment thereof; a murine antibody or fragment thereof; a chimeric antibody or fragment thereof; a humanized antibody or fragment thereof; a bispecific antibody; a peptide; a fusion protein; and a protein.

13 57. A therapeutic composition for inducing a host immune response against a multi-epitopic *in vivo* antigen that does not elicit an effective host immune response, the composition comprising a binding agent that specifically binds a first epitope on the antigen to form a binding agent/antigen pair whereby a host immune response is elicited against a second epitope on the antigen, said binding agent present in the composition being non-radiolabeled.

17 58. The composition of claim 57, wherein the antigen is a soluble antigen.

21 59. The composition of claim 58, wherein the soluble antigen is a tumor-associated antigen.

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1 60. The composition of claim 57, wherein the binding agent is selected from the
group consisting of one member of an immunologic pair; an antibody or fragment
thereof; a murine antibody or fragment thereof; a chimeric antibody or fragment
thereof; a humanized antibody or fragment thereof; a bispecific antibody; a peptide; a
5 fusion protein; and a protein.

61. The composition of claim 60, wherein the binding agent comprises a native
antibody.

9 62. The composition of claim 60, wherein the antibody comprises an IgG1
antibody.

63. The composition of claim 60, wherein the binding agent is a murine
monoclonal antibody.

64. The composition of claim 63, wherein the binding agent does not induce
isotypic HAMA-induced toxicity in the host.

65. The composition of claim 57, wherein the binding agent comprises B43.13.

21 66. The composition of claim 57, wherein the binding agent has been activated.

67. The composition of claim 66, wherein the binding agent has been exposed to
radiation.

1 68. The composition of claim 67, wherein the the irradiation is ultraviolet radiation.

5 69. The composition of claim 66, wherein the binding agent that has been photoactivated.

9 70. The composition of claim 57, wherein the antigen is an antigen selected from the group consisting of CA 125, CA 15.3, CA 19.9, PSA, an ovarian tumor antigen, and a gastrointestinal cancer antigen.

71. The composition of claim 57, wherein the binding agent is present in an amount of from about 0.1 μ g to about 2 mg per kg of body weight of the host.

72. The composition of claim 71, wherein the amount of binding agent comprises between about 0.1 μ g and about 200 μ g per kg of body weight of the host.

73. The composition of claim 57, wherein the binding agent is present in an amount comprising a total dose of up to about 2 mg.

21 74. A therapeutic composition for altering a host immune response against an antigen comprising a binding agent that specifically binds to the antigen and alters the immune response against the antigen, the binding agent present in the composition being non-radiolabeled, and being present in an amount of from about 0.1 μ g to about 2 mg per kg of body weight of the host.

1 75. The composition of claim 74, wherein the antigen is an *in vivo* antigen that
does not elicit an effective host immune response.

5 76. The composition of claim 75, wherein the antigen is a soluble antigen and
wherein a host immune response is induced against the antigen.

77. The composition of claim 76, wherein the antigen is a multi-epitopic
tumor-associated antigen.

9 78. The composition of claim 74, wherein the antigen is CA 125.

13 79. A therapeutic composition for inducing a host immune response against a
multi-epitopic *in vivo* antigen comprising a binding agent exclusive of B43.13, that
specifically binds to a first epitope on the antigen to form a binding agent/antigen
pair, whereby a host immune response is elicited against a second epitope on the
antigen.

17 80. The composition of claim 79, wherein the antigen is a soluble, tumor-associated
antigen.

21 81. The composition of claim 79, wherein the antigen to be contacted does not
elicit an effective host immune response.

1 82. The composition of claim 80, wherein the binding agent that has been activated.

5 83. The composition of claim 82, wherein the binding agent has been exposed to ultraviolet irradiation.

9 84. A therapeutic composition for altering the host immune response against an antigen comprising a binding agent exclusive of B43.13 that specifically binds to the antigen and alters the immune response against the antigen, wherein the binding agent is present in an amount of from about 0.1 μ g to about 2 mg per kg of body weight of the host.

13 85. The composition of claim 84, wherein the antigen is an *in vivo* antigen that does not elicit an effective host immune response.

17 86. The composition of claim 85, wherein the antigen is a soluble antigen and wherein a host immune response is induced against the antigen.

21 87. The composition of claim 86, wherein the antigen is a multi-epitopic tumor-associated antigen.

88. The composition of claim 57, 74, 79, or 84, wherein the antigen is associated with a human disease or pathological condition.

1 89. The composition of claim 88, wherein the antigen is an antigen selected from the group consisting of CA 125, CA 15.3, CA 19.9, PSA, an ovarian tumor antigen, and a gastrointestinal cancer antigen.

5 90. The composition of claim 88, wherein the human disease or condition is selected from the group consisting of cancer; tumor; drugs of abuse; multiple sclerosis; allergy; human immunodeficiency virus; bacterial infection; autoimmune diseases; human viruses; and asthma.

9 91. The composition of claim 57, 74, 79, or 84, wherein the induced or altered immune response comprises a beneficial immune response.

13 92. The composition of claim 91, wherein the beneficial immune response comprises an effective host immune response.

17 93. The composition of claim 91, wherein the beneficial immune response includes at least one of the following: reduction in tumor size; reduction in tumor burden; stabilization of disease; production of antibodies against the binding agent/antigen complex; induction of the immune system; induction of one or more components of the immune system; cellular immunity and the molecules involved in its production; humoral immunity and the molecules involved in its production; ADCC immunity and the molecules involved in its production; CDC immunity and the molecules involved in its production; natural killer cells; cytokines and chemokines and the molecules and cells involved in their production; antibody-dependent cytotoxicity; complement-dependent cytotoxicity; natural killer cell activity; and antigen-enhanced cytotoxicity.

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1 94. The composition of claim 57, 74, 79, or 86, wherein the host immune response comprises a cellular and a humoral immune response.

5 95. The composition of claim 94, wherein the humoral response comprises anti-idiotypic antibodies.

96. The composition of claim 57, 74, 79, or 86, wherein the host immune response comprises a cellular immune response.

9 97. The composition of claim 57, 74, 79, or 86, wherein the host immune response comprises a humoral immune response

13 98. The composition of claim 97, wherein the humoral response comprises anti-idiotypic antibodies.

17 99. A therapeutic composition for inducing a host immune response against a pre-determined multi-epitopic antigen present in a host's serum, which antigen does not elicit an effective host immune response, comprising a binding agent that specifically binds to the antigen to form a binding agent/antigen pair, whereby a beneficial host immune response is elicited against the antigen.

21 100. The composition of claim 99, wherein the multi-epitopic antigen is a soluble, tumor-associated antigen.

- 1 101. The composition of claim 100, wherein the binding agent specifically binds to a first epitope on the antigen and wherein a host immune response is elicited against a second epitope on the antigen.
- 5 102. The composition of claim 57, 74, 79, or 84, further comprising determining the amount of antigen present in the host prior to contacting the antigen with the composition.
- 9 103. The composition of claim 102, wherein the determination of the amount of antigen present in the host further establishes that the antigen is present in an amount greater than an amount indicative of a disease condition.
104. The composition of claim 103, wherein the determination of the amount of antigen present in the host further establishes that the antigen is present in an amount greater than about three times the amount indicative of a disease condition.
105. The composition of claim 57, 74, 79, or 84, wherein contacting comprises administering by any immunologically suitable route.
106. The composition of claim 105, wherein administering by any immunologically suitable route comprises intravenous or subcutaneous administration.
- 21 107. The composition of claim 57, 74, 79, or 84, further comprising one or more adjuvants, one or more carriers, one or more excipients, one or more imaging

1 reagents, one or more pharmaceutically acceptable carriers, and/or physiologically
acceptable saline.

5 108. The composition of claim 57, 74, 79, or 84, wherein the binding agent is at a
dosage that is the maximum amount of binding agent that does not produce ADCC.

109. The composition of claim 57, 74, 79, or 84, wherein the binding agent is
coupled to a photodynamic agent.

9 110. The composition of claim 109, wherein the photodynamic agents include
hypocrellin and hypocrellin derivatives.

111. The composition of claim 109, wherein the host is irradiated with a visible
light source.

112. The composition of claim 74, 79, and 84, wherein the binding agent is selected
from the group consisting of one member of an immunologic pair; an antibody or
fragment thereof; a murine antibody or fragment thereof; a chimeric antibody or
fragment thereof; a humanized antibody or fragment thereof; a bispecific antibody; a
peptide; a fusion protein; and a protein.